Regional Operational Plan ROP.SF.2A.2015.13

Operational Plan: Jim Creek Coho Salmon Escapement, 2015–2016

by

Samantha Oslund

February 2016

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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Signature Page

Project Title:	Jim Creek coho salmon escapement 2015-2016
Project leader(s):	Samantha Oslund
Division, Region, and Area	Division of Sport Fish, Region II, NCIMA
Project Nomenclature:	
Period Covered	July 15-September 30, 2015
Field Dates:	July 15-September 30, 2015
Plan Type:	Category II

Approval

Title	Name	Signature	Date
Project leader	Samantha Oslund		4/28/15
Biometrician	Daniel Reed		4/27/2015
Research Coordinator	Tim McKinley		6/30/15

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ABSTRACT

This document provides a detailed summary of the operations of a floating resistance-board weir in the Jim Creek drainage to enumerate fish passage, in particular, coho salmon (*Oncorhynchus kisutch*) stocks, during 2015–2016. The number of adult coho and sockeye salmon that pass through the weir from 20 July to 30 September will be counted and estimates of sex composition for adult coho salmon and age and sex composition of adult sockeye salmon will be made for both years.

Key words: Jim Creek, coho salmon, escapement, genetics age-sex-length, ASL.

INTRODUCTION

Escapement information for Jim Creek coho (*Oncorhynchus kisutch*) and sockeye salmon (*Oncorhynchus nerka*) is needed by the Alaska Department of Fish and Game (ADF&G) to manage the sport fisheries that utilize these stocks. Jim Creek coho and sockeye salmon are currently harvested in mixed-stock commercial fisheries in Upper Cook Inlet. They are also harvested in a weekly Wednesday–Sunday sport fishery in July and after the second Saturday in August through 31 December. Jim Creek coho and sockeye salmon may also be harvested in educational permit fisheries. Coho salmon escapement is measured with the weir above the sport fishery (Figure 1). The sustainable escapement goal (SEG) range for coho salmon in McRoberts Creek within the Jim Creek drainage is 450–700 coho salmon (Fair et al. 2013).

COHO SALMON

Jim Creek enters the glacial Knik River about 10 river miles from salt water. Most sport fishing occurs at the confluence of Jim Creek and the Knik River, an area locally known as the Jim Creek Flats. Fishing effort and harvest rates in the Jim Creek Flats area are strongly influenced by the Knik River because its glacial waters can inundate the entire area. Powered and nonpowered boats can access upstream reaches of Jim Creek.

Jim Creek supports a large recreational fishery; the average effort from 2008 to 2012 was 15,500 angler days. This is about 16% of the entire sport fishing effort in the Northern Cook Inlet Management Area (NCIMA). On average, anglers harvested 9,100 coho salmon from 2008 to 2012. Jim Creek harvest rates have been higher than the Little Susitna River for 2006–2009 and 2011–2012, but effort is slightly less than the Little Susitna River. This makes the Jim Creek coho salmon fishery the second most harvested coho salmon fishery in the state, following the Kenai River coho salmon sport fishery.

A survey of spawning coho salmon is currently conducted during the peak spawning period by foot or canoe surveys in McRoberts Creek and Upper Jim Creek (Table 1). A weir was operated from 1993 to 1994 in this drainage to provided counts of coho salmon escapement, which ranged from 5,532 to 6,451 fish. Coho salmon return to Knik Arm fisheries from late July through August. Spawning occurs from late September through mid-October (Oslund et al. *In prep*[1]).

The sport fish crew will also collect tissue samples from coho salmon to establish a Jim Creek genetics baseline sample for the ADF&G gene conservation laboratory.

[1] Oslund, S., S. Ivey, and D. Lescanec. *In prep*. Area Management Report for the recreational fisheries of northern Cook Inlet, 2013. Alaska Department of Fish and Game, Fishery Management Report Anchorage.

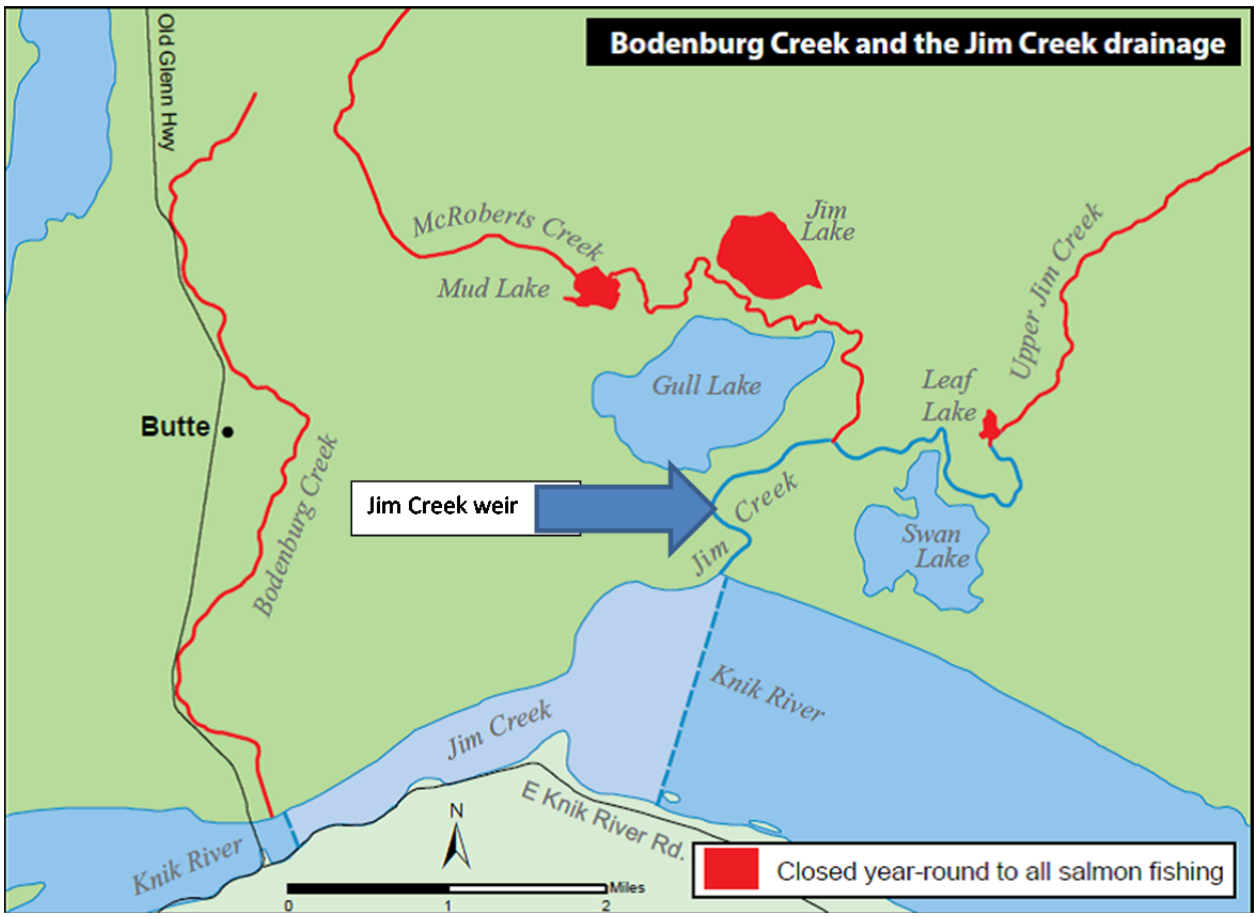

Figure 1.–Proposed weir location in the Jim Creek drainage.

SOCKEYE SALMON

The Jim Creek sockeye salmon escapement is assessed jointly by the Divison of Sport Fish Palmer (SF) and the Division of Commercial Fisheries Division in Soldotna (CF). CF will read the sockeye salmon scales, calculate age and sex composition, length-at-age, and report the results. SF will collect escapement data, publish results in an Annual Management Report (AMR), and send sockeye salmon scales to CF staff in Soldotna for analysis.

The Jim Creek sockeye salmon escapement was assessed jointly with coho salmon from 1993 to 1994 and escapement ranged from 3,500 to 5,100 sockeye salmon. Harvest from 2008 to 2012 for Jim Creek was estimated at 2,400 sockeye (Oslund et al. *In prep*).

Table 1.–Knik Arm drainage coho salmon escapement counts for McRoberts and Jim creeks, 1981–2014.

		Jim Creek drainage		
Year	Weir	McRoberts Creek index [a]	Upper Jim Creek index [a]	Total
1981				[e]
1982				[e]
1983				[e]
1984				[e]
1985		662		662
1986		439		439
1987		667		667
1988		1,911		1,911
1989		597		597
1990		599	589	1,188
1991		484	418	902
1992		11	59	70
1993	5,532	503	535	1,038
1994	6,451	506	2,119	2,625
1995		702	1,288	1,990
1996		72	439	511
1997		701	563	1,264
1998		922	560	1,482
1999		12	320	332
2000		657	2,561	3,218
2001		1,019	575	1,594
2002		2,473	1,630	4,103
2003		1,421	393	1,814
2004		4,652	1,045	5,697
2005		1,464	1,883	3,347
2006		2,389	1,750	4,139
2007		725	1,150	1,875
2008		1,890	1,029	2,919
2009		1,331	1,193	2,524
2010		242	420	662
2011		261	229	490
2012		213[g]	495	708
2013		663	1,029	1,692
Average				
1981–2013	–	972	928	1,740
2004–2013	–	1,383	1,022	2,405
2009–2013	–	542	673	1,215
2014		122	618	740
SEG range		450–700		

Note: "–" means the value can't be calculated due to limitations of the data.

[a] Foot surveys unless otherwise noted.

[b] Weir located at RM 34 in 1986 and 1988–1995; weir located at RM 71 from 1996–2010.

[c] 1982–1991 weir count plus stream survey; 1992, 1993 wier count; 1994–1996 and 2004–2008 and 2011 weir was removed on 15 August before the majority of the coho run. In 1997, the weir was out on 1 September.

[d] Combination weir and foot survey. Weir was removed prior to completion of coho run.

[e] No survey conducted.

[f] Incomplete or partial count due to weir submersion.

[g] Count conducted late due to high water.

[h] Coho salmon counted below weir after it was pulled. Fish Creek: 761 (2000), 800 (2001), 536 (2002), 911 (2003), 1,840 (2004), 825 (2005), 756 (2006), 2,750 (2007), 4,735 (2008), 452 (2009), 57 (2010), 872 (2011). Cottonwood Creek: 20 (1999), 406 (2000), 604 (2001), 189 (2002), 85 (2003), 266 (2004).

[i] Beginning in 1999, the highest count of three counts occurred within a 2-week period.

[j] Weir discontinued

[k] Poor counting conditions.

[l] Index discontinued after more than half the index area was destroyed by the Matanuska River.

OBJECTIVES

PRIMARY OBJECTIVES

1) Count the number of adult coho and sockeye salmon in Jim Creek that pass through the weir from 20 July to 30 September.

2) Estimate the sex composition of the adult coho salmon escapement in Jim Creek such that the estimates are within 13 percentage points of the true values 95% of the time.

3) Estimate the age composition and sex composition of the adult sockeye salmon escapement in Jim Creek such that the age composition estimates are within 9 percentage points of the true values 95% of the time and the sex composition estimates are within 7 percentage points of the true values 95% of the time.

SECONDARY OBJECTIVES

1) Collect tissue samples from 100 Jim Creek coho salmon for the CF Gene Conservation Laboratory.

2) Collect a database of scales, sexes, and lengths from the Jim Creek coho and sockeye salmon runs.

3) Estimate mean length by sex for Jim Creek coho salmon.

4) Estimate mean length-at-age and age-by-sex composition for Jim Creek sockeye salmon.

5) Identify and count all species of fish that move through the live trap from weir installation until weir removal.

6) Record water temperature twice daily and water stage once daily for inseason management purposes.

METHODS

SAMPLING AND DATA COLLECTION

Escapement

A floating resistance-board weir will be installed on Jim Creek about 1.0 river miles (RM) upstream of the mouth (Figure 1) on or about 20 July and will operate until 30 September each year. Spaces between adjacent pickets on the weir and live trap are less than or equal to 38 mm

(1.5 in); this spacing will prevent all but the smallest 0-ocean-age (jack) coho salmon and small pink salmon from passing between pickets. Technicians will count fish passing through the live trap; fish that pass through the pickets will not be recorded. The trap will be closed at night, during breaks, and while boats pass.

All salmon will be identified and counted as they swim through a live trap or as they are released upstream of the weir after being sampled for age, length, and sex (Objective 1). The weir will be staffed by 2 sport fish technician at all times, and fish will be counted during daylight hours. The weir will be regularly cleaned of debris and inspected for gaps that would allow salmon to pass upstream undetected.

High water events have the potential to partially submerge the weir during the coho salmon run. When the weir is partially submerged, it is possible that salmon could pass over the weir undetected. Technicians will attempt to keep the weir floating during high water events by removing debris that is submerging the panels. However, if this is no longer possible, technicians will record the time and date that the weir is submerged, and will record details about how much of the weir is submerged. When water stage drops and the water turbidity decreases enough so that salmon can be positively identified and counted, the date and time will be recorded when counting has resumed.

The weir escapement for each species will be the number counted at the weir, and will be noted in the inseason15xls (inseason15.xls in 2015 inseason16.xls in 2016) files (Microsoft Excel[1]) and in the NCIMA escapement timing.xls file after each season.

The following information will be collected each day and reported to the Palmer ADF&G office before 8:00 AM the following day:

1) number of sockeye salmon adults passed upstream of the weir
2) number of jack sockeye salmon passed upstream of the weir
3) number of coho salmon passed upstream of the weir
4) number of coho salmon sampled for genetic tissue
5) number of salmon by species sampled for age, length, and sex
6) number and species of other fish passed through the live trap of the weir
7) water temperature and water stage at 9:00 AM
8) boat traffic
9) any comments regarding the ability to accurately count salmon through the live trap

The information detailed above will be recorded on a daily report form (Appendix A1). Data will be recorded in a Rite-in-the-Rain notebook that will be returned to the project biologist at the end of the season.

Biological Samples

Coho Salmon Sex Composition and Length

The sample size goal for estimating length and sex composition for coho salmon (Objective 2) is set at 40 coho salmon per sample period. The sample periods for 2015 were established by consulting coho salmon run timing data from 1993–1994 weir operations and will be stratified into 6 sampling periods with a target sample size of 40 coho salmon per period:

[1] Products names used in this publication are included for completeness but do not constitute product endorsement.

1) 20 July–9 August
2) 10 August–16 August
3) 17 August–23 August
4) 24 August–30 August
5) 31 August–6 September
6) 7 September–30 September

Daily sample size targets during periods 1 and 6 will be up to 3 coho salmon per day until the period target of 40 samples is achieved. Daily sample size targets during periods 2, 3, 4, and 5 will be up to 6 coho salmon per day until the period target of 40 samples is achieved. The crew leader may increase the daily sample size above the daily target if it is judged necessary to do so in order to achieve a sample size of 40 for the sampling period.

This effort will yield up to 240 samples per year and will provide samples from all portions of the run. Sampling effort will not be proportional to the run and temporally stratified estimators will be necessary to estimate sex composition and mean length by sex. Based on a binomial model (Cochran 1977) to estimate sex composition within each temporal strata, we expect this sampling effort to be sufficient to meet the precision criteria in Objective 2, even if the run timing is as compressed as was observed in 1994 when 79% of the coho salmon passed the weir during 1 week. If run timing is more dispersed, similar to that observed in 1993, our estimates will be more precise than specified in Objective 2.

To satisfy Secondary Objective 2, for each coho salmon sampled, scales will be taken from the preferred area on the left side of the body at a point on a diagonal line from the posterior edge of the dorsal fin to the anterior edge of the anal fin and 2 rows above the lateral line (Appendices B1–B2; Clutter and Whitesel 1956). The sex of each sampled fish will be identified from external sexual characteristics. Mid eye to tail fork (METF) length will be measured to the nearest 1 mm (Appendices B1 and B3).

Scales will be mounted on gum cards, with 3 scales taken from each coho salmon (Appendices B1–B2). All age-sex-length (ASL) data will initially be recorded in a “Rite-in-the-Rain” book. Coho salmon length and sex data will be transcribed on the Upper Cook Inlet Adult Salmon Age-Length forms (Appendices B4–B5). Coho salmon scales will be preserved but not aged for this project.

Sockeye Salmon Age and Sex Composition and Length

The sample size goal for estimating age, sex, and length composition for sockeye salmon (Objective 3) is set at 200 sockeye salmon for the year. The 1993 and 1994 sockeye salmon counts at the Jim Creek weir were 3,472 and 5,197 respectively. We assumed a minimum escapement of 3,000 in 2015, resulting in the sampling rate of 1 in 15 to yield 200 samples. Based on a binomial model (Cochran 1977), the sample size necessary to meet our precision criterion for sex composition in Objective 3 is 196, without considering a finite population correction (FPC). Based on a multinomial model (Thompson 1987), the sample size necessary to meet our precision criterion for age composition (assuming scales from 20% of the fish sampled are unreadable) is 196, without considering an FPC.

One sockeye salmon will be sampled on the first day that sockeye salmon are detected at the weir. On all days following the first day of sampling, the previous day's passage will be divided by 15 and rounded to the nearest integer to calculate the sample target for sockeye salmon for that day. If on any given day, passage is so small that the target cannot be achieved, additional fish will be sampled on the following day to make up the difference. Late in the run when sockeye salmon passage at the weir falls consistently below 8 sockeye salmon per day, the crew leader may opt to attempt to sample at a rate of 1 in 15 while considering accumulated counts over 2 or more days.

For each sockeye salmon sampled, scales will be taken from the preferred area on the left side of the body at a point on a diagonal line from the posterior edge of the dorsal fin to the anterior edge of the anal fin and 2 rows above the lateral line (Appendices B1–B2; Clutter and Whitesel 1956). The sex of each sampled fish will be identified from external sexual characteristics. Mid eye to tail fork (METF) length will be measured to the nearest 1 mm (Appendices B1 and B3).

Scales will be mounted on gum cards, with 3 scales taken from each sockeye salmon (Appendices B1–B2). All ASL data will initially be recorded in a "Rite-in-the-Rain" book. Sockeye salmon length and sex data will be transcribed on the Upper Cook Inlet Adult Salmon Age-Length forms (Appendices B4–B5).

Coho Salmon genetic sample

The sample size goal for creating a genetic baseline for Jim Creek coho salmon is 100 coho salmon annually. Axillary processes will be removed from every other coho salmon sampled for length and sex, resulting in a sample of approximately 20 per sample period for a total sample of approximately 120 (Secondary objective 1). Each sample will be cleaned of sand and slime and will be placed in a small numbered plastic vial (Appendix C1). The vial number will be recorded in a Rite-In-the Rain notebook while sampling. The vial number will be recorded as a genetics number on the Upper Cook Inlet Adult Salmon Age-Length form.

DATA ANALYSIS

The sex proportions of the coho salmon escapement by sampling stratum (period) will be estimated as follows:

$$\hat{p}_{tz} = \frac{n_{tz}}{n_t} \tag{1}$$

where $\hat{p}_{tz}$ is the estimated proportion of salmon passing the weir during sampling stratum *t* from sex category *z*, n_{tz} equals the number of fish sampled during sampling stratum *t* that were classified as sex category *z*, and n_t equals the number of coho salmon sampled for sex determination during sampling stratum *t*.

The sampling variance of $\hat{p}_{tz}$ will be estimated as

$$\hat{var}[\hat{p}_{tz}] = \left(1 - \frac{n_t}{N_t}\right) \frac{\hat{p}_{tz}(1-\hat{p}_{tz})}{n_t - 1} \tag{2}$$

where N_t is the number of coho salmon passing the weir during sampling stratum *t*.

The estimates of escapement by sex categories in each sampling stratum will be calculated by

$$\hat{N}_{tz} = N_t \hat{p}_{tz} \tag{3}$$

with its variance estimated as

$$\hat{var}\left[\hat{N}_{tz}\right] = N_t^2 \hat{var}[\hat{p}_{tz}]. \tag{4}$$

The total escapement abundance by sex category and its variance will then be estimated by summation as follows:

$$\hat{N}_z = \sum_{t=1}^{L} \hat{N}_{tz} \tag{5}$$

and

$$\hat{var}\left[\hat{N}_z\right] = \sum_{t=1}^{L} \hat{var}\left[\hat{N}_{tz}\right] \tag{6}$$

where *L* equals the number of sampling strata.

Finally, the total proportion of the escapement by sex categories and its variance will be estimated as follows:

$$\hat{p}_z = \frac{\hat{N}_z}{N} \tag{7}$$

and

$$\hat{var}[\hat{p}_z] = \frac{\hat{var}\left[\hat{N}_z\right]}{N^2} \tag{8}$$

where *N* is the total escapement of coho salmon across all sampling periods.

The mean length by sex for coho salmon escapement by sampling stratum will be estimated as

$$\bar{x}_{tz} = \frac{\sum_{i=1}^{n_{tz}} x_{tzi}}{n_{tz}} \tag{9}$$

where $\bar{x}_{tz}$ is the estimated mean length of salmon passing the weir during sampling stratum *t* from sex category *z*, x_{tzi} is the length of the *i*th fish sampled of sex *z* during sampling stratum *t*.

The sampling variance of $\bar{x}_{tz}$ will be estimated as

$$\hat{var}\left[\bar{x}_{tz}\right] = \frac{\sum_{i=1}^{n_{tz}} \left(x_{tzi} - \bar{x}_{tz}\right)^2}{n_{tz}\left(n_{tz} - 1\right)} \tag{10}$$

The mean length by sex categories is then estimated as follows:

$$\bar{x}_z = \sum_{t=1}^{L} \frac{\hat{N}_{tz}}{\hat{N}_z} \bar{x}_{tz} \tag{11}$$

with its variance approximated using a Taylor's series expansion (Mood et al. 1974):

$$\hat{var}\left[\bar{x}_z\right] \approx \sum_{t=1}^{L} \frac{\hat{N}_{tz}^2}{\hat{N}_z^2} \hat{var}\left[\bar{x}_{tz}\right] + \sum_{t=1}^{L} \frac{\left(\bar{x}_{tz}\hat{N}_z - \left(\sum_{u=1}^{L} \bar{x}_{uz}\hat{N}_{uz}\right)\right)^2}{\hat{N}_z^4} \hat{var}\left[\hat{N}_{tz}\right]. \tag{12}$$

If sockeye salmon are sampled proportional to passage at the weir, sex and age proportions and abundances by sex and age and their variances will be estimated using Equations 1–4 with appropriate substitutions ignoring references to time strata. Similarly, mean lengths by sex and age will be estimated using Equations 9–10 with appropriate substitutions ignoring references to time strata. If sampling is not proportional to passage, poststratification by time period based on sampling intensity will be required, and Equations 1–12 will be used to estimate the desired parameters with appropriate substitutions.

DATA REDUCTION

The field technician will maintain the daily report form (Appendix A1) and a field notebook of daily information at the weir camp. Daily weir counts, water data, and comments will be reported by telephone to the Palmer Office (746-6322). A Palmer biologist will enter the data into a Microsoft Excel spreadsheet (following the structure of the form described in Appendix A1) located in the O:\SF\INSEASON\2015 (in 2015) or O:\SF\INSEASON\2016 (in 2016). The data will then be uploaded to the SF intranet (http://docushare.sf.adfg.state.ak.us/dsweb/View/Collection-6451) for access by both SF and CF biologists for management decisions. Coho salmon counts will be available for public viewing on the SF Internet site: "Fish Count Database."

At the end of the season, the data in the daily report form will be reconciled with the data that was recorded via telephone during the season. If discrepancies occur, the assistant project biologist and field crew will confer to determine the appropriate values.

Sockeye salmon sex-length data and scale cards will be sent midseason and postseason to Wendy Gist (Fisheries Biologist I) in charge of catch and escapement sampling program in Soldotna CF.

Coho salmon sex-length data and scale cards will be stored in the Palmer office, and coho genetic samples will be sent to the Gene Lab.

SCHEDULE AND DELIVERABLES

Dates of sampling events and other field and office activities are summarized below. Results will be published in the 2015–2016 and 2016–2017 Area Management Reports (AMRs) for the recreational fisheries of Northern Cook Inlet.

Dates	Activity
20 July–30 September	Escapement counts
1 October	Sockeye salmon scales shipped to Soldotna SF
15 October	Coho genetic samples sent to Gene Lab
December	Results published in AMR

RESPONSIBILITIES

Fishery Biologist II (SF). Oversees project by writing operational plan, preparing budgets, hiring and supervising crewmembers, tracking implementation of operational plan, providing assistance and direction when needed, summarizing data, publishing results.

Fishery Biologist I (SF). Establishes safe and effective weir and camp. Maintains daily contact with and supervises field crew. Reviews daily reporting and summarization of data. Provides necessary level of training. Provides assistance and direction to the crew when needed. Completes routine administrative duties such as reviewing time sheets and approving leave. Tracks the budget and authorizes purchases. Routinely visits with the crew to observe activities, provides assistance and support, and discusses weir operation. Acquires daily data numbers from crew and updates, inseason and public data bases. Prepares genetic samples for CF in Anchorage.

Biometrician III (SF). Assists in sampling design, sample size selection, and writing of operational plan.

Fish and Wildlife Technician II (SF): Conducts all aspects of field sampling according to the operational plan and verbal instructions. Performs routine maintenance on all state issued equipment. Reports to the Palmer office daily and to the Assistant Project Biologist on holidays and weekends. Purchases all routine and expected supplies. Provides Assistant Project Leader with all receipts for purchases. Turns in completed timesheets on the first and 16th of each month.

Expeditor: Assists with acquisition of supplies for weir crew. Helps with ASL sampling when needed. Acts as a crew member in the event of an absence. Provides Assistant Project Leader with all receipts for purchases. Turns in completed timesheets on the first and 16th of each month.

Assisting Personnel, Fisheries Biologist I (CF): Provides instruction for sampling methods and manuals for salmon ASL sampling. Ages salmon scales, compiles data, and writes data reports.

FY 16 BUDGET

Project: Jim Creek Sockeye

Dates: 13 July–30 September

FY 2016 Allocation

Line	Description	Amount (104.9)
100	Personnel	87.2

200	Travel	0.0
300	Services	7.9
400	Supplies	9.8
500	Equipment	0.0
Total		104.9

REFERENCES CITED

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APPENDIX A: ADULT WEIR PASSAGE DATA FORM

Appendix A1.–Example of adult weir passage data form for Jim Creek, 2015.

Jim Creek weir data for 2015; genetic goal 100

	Coho salmon				Sockeye salmon								River water			
Date	Daily	Cumulative	Pro-jection	Number genetic sample	Adults sampled	Jacks	Total daily	Cum-ulative	Pro-jection	Chinook salmon sampled	Pink daily	Chum daily	Other daily	Stage (ft)	Temp. (°C)	Comments
15 Jul																
16 Jul																
17 Jul																
18 Jul																
19 Jul																
20 Jul																
21 Jul																
22 Jul																
23 Jul																
24 Jul																
25 Jul																
26 Jul																
27 Jul																
28 Jul																
29 Jul																
30 Jul																
31 Jul																
1 Aug																
2 Aug																

APPENDIX B: ASL SAMPLING PROCEDURES

Appendix B1.–Fish sampling procedures.

Sampling procedures

1) Check species of each intended sample.
2) Sex the fish. If any difficulty is encountered in species identification or sexing, ask your supervisor for help as soon as possible before sampling any additional fish.
3) Measure all species' lengths from the middle of the eye to the fork of the tail to the nearest 1 millimeter (Appendix B3).
4) Take 1 sockeye salmon scale from the "preferred area" of the fish using forceps. The "preferred scale" is located on the left side of the fish, 2 rows above the lateral line on the diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (Appendix B2). If the "preferred scale" is missing, select a scale within the preferred area on either the left or right side of the fish. If no scales are present in the "preferred area" on either the left or right side of the fish and sufficient numbers of fish are available for sampling, disregard the fish. If the number of fish is limited and scales are absent in the "preferred area" on both sides of the fish, sample a scale as close to the preferred area as possible and note on the Age-Length Form (Appendix B5).
5) Take a close look at the scale to assess whether it is regenerated or reabsorbed. If it is, pull another.
6) Remove all slime, grit, and skin from the scale by moistening and rubbing between fingers.
7) If the scale is stuck or dried, moisten and pull toward the head of the fish gently rather than straight back.
8) Clean, moisten, and mount scale on gum card directly over number 1 (Appendix B2). The side of the scale facing up on the gum card is the same as the side facing up when it was adhered to the fish. This outward facing side is referred to as the "sculptured" side of the scale. The ridges on this sculpture side can be felt with a fingernail or forceps. Position each scale on the card vertically, with the posterior part of the scale consistently either at the top or the bottom.
9) Repeat steps 1 through 7 for up to 40 fish on each Age-Length Form.
10) Make sure the scale card is filled out with the correct data: species, locality, date, collectors.
11) Do not put several days' scales on 1 card.
12) Cover the completed dried gum card with waxed paper.
13) Store the cards in order between 2 pieces of plywood in a dry, safe place.
14) Fill out the daily Age-Length Form when you are finished sampling for the day.

General guidelines

1) Note which number to begin with, for each sample location, for the date in question.
2) Prior to sampling, cards may be filled out with species, date, gear, location, and collector's name. They may also be numbered when the total cards for a given area are known for that date. These must be carefully checked when scales are to be fixed to assure correct information.
3) On location before mounting scales, remaining pertinent information should be completed on that card, in pencil.

-continued-

Card information explanation (Age-Length Form; Appendix B5)

1) Species: (*O. nerka* or reds) Scientific or common name of sample (Sockeye for Fish Creek).
2) Card No.: Consecutive for this area and species.
3) Locality: Name of beach, river, or area and may include cannery or site name (Fish Creek) .
4) Stat. code: and Sampling date: Transfer the appropriate digits from the AWL form.
5) Sampling date: mo./day/year that the scales were taken for escapement samples.
6) Sampler: last name(s) of person(s) collecting scales and data.
7) Comments: Include anything unusual about weather, the sample or anything else considered pertinent by collectors.

Miscellaneous

1) Protect the scale cards from getting wet. When scales are sampled in wet conditions, it is difficult to mount scales to get good impressions. Glue often obscures scale features and scales adhere poorly to the card. Cover card with plastic while sampling, keep in closed clipboard, use an umbrella, or build a shelter.
2) Write in all comments explicitly and completely under remarks.
3) Responsibility for accuracy lies first with the primary data collector(s). The crew supervisor will return sloppy or incomplete data to individual collectors. After editing a form, write samplers initials on the form.

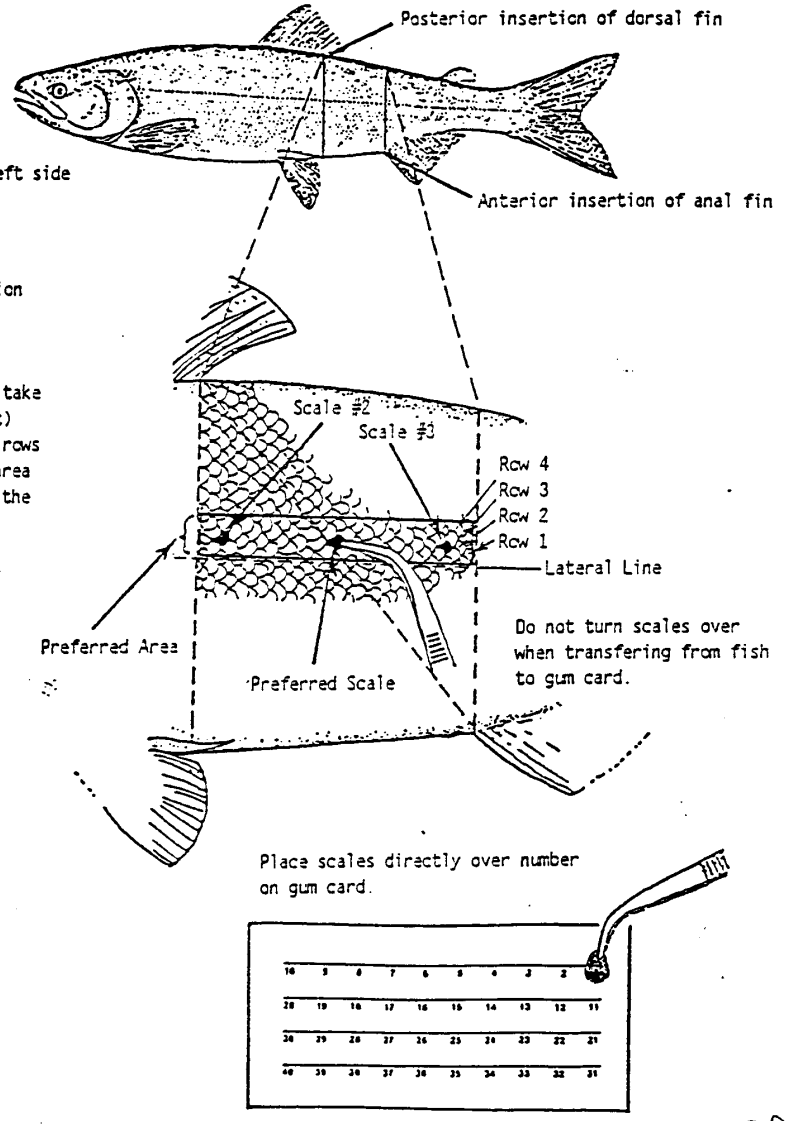
Remember-DO'S

1) Do carefully and completely label each gum card and its corresponding AWL form.
2) Do number gum cards and AWL forms sequentially throughout the season for each sampling location (port, river, lake) for each species.
3) Do take the preferred scale if available.
4) Do clean the scale thoroughly before mounting.
5) Do mount scales sculptured side up in straight rows and columns, and consistently position the scales in 1 direction.
6) Do carefully store and protect completed gum cards and AWL forms.
7) Do remount rain-soaked or damaged gum cards.

Remember-DONT'S

1) Don't put scales from different locations, dates, or species on 1 gum card.
2) Don't take scales from other than the preferred area.
3) Don't mount dirty or damaged scales.
4) Don't put wax paper on wet scale cards; wait for the card to dry.

Appendix B2.–Scale collection.



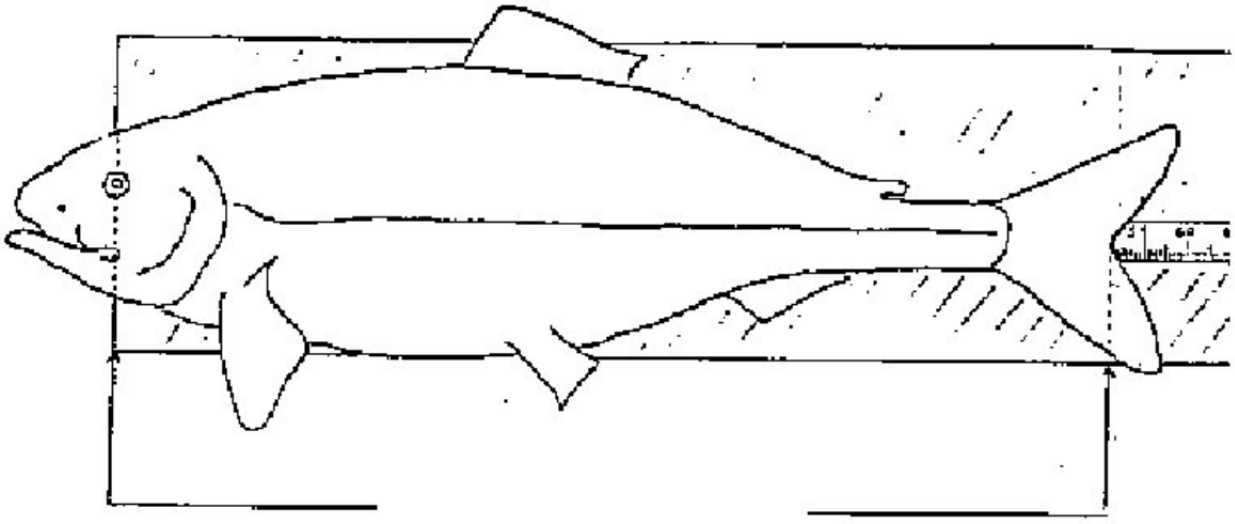
Take the preferred scale on the left side of the fish, two rows above the lateral line and on the diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin.

If the preferred scale is missing, take a scale again on the left (or right) side of the fish no more than four rows above the lateral line within the area behind the dorsal fin and ahead of the anal fin.

If sampling more than one scale per fish take the preferred scale and scale #2 and scale #3 as shown or the closest scales thereof.

DO NOT flip scale upside down and do not get gum card wet

Appendix B3.–Measuring fish length.



Because the length and form of the snout of salmon changes as the fish approaches sexual maturity, length measurements are made from the middle of the eye to the fork of the tail. Length of live fish is recorded to the nearest 5 millimeters. The procedure for measuring length (mid eye to tail fork) of the salmon is as follows:

1) Place the salmon flat on the board with the head to your left and the dorsal fin away from you.

2) Make sure the eye is directly over the end of the board. Line the eye of the salmon up with the edge of the board and hold the head in place with your left hand.

3) Flatten and spread the tail against the board with right hand. Line up the middle of the eye of the salmon with the end of the measuring tape while holding the fish in place with your left hand.

4) Read the mid eye to tail fork length to the nearest 1 millimeter.

Appendix B4.–Instructions for CF Age-Length Form.

Use Division of Commercial Fisheries Age-Length Form.

Card: ***Gum cards will be number sequentially with the first letter of Creek Name:***

Fish Creek – F 001 is the first card number,

Each Age Length Form will have a corresponding gum card.

Date: ***Enter the date of the sample.***

Samplers: ***Enter the last name of the samplers***

Sex: ***Enter either a 1- male or 2- female. Determine sex by external characteristics.***

Length: ***Enter the mid eye to tail fork length to nearest millimeter.***

On the yellow side of the gum card enter the following:

1) Species of fish : Sockeye
2) Location: Fish Creek
3) Stat Code: 247-50-000-801
4) Date : Month Day Year
5) Gear : Weir
6) Name(s) of samplers: Last Name
7) Remarks: weather, weir, sampling conditions, etc.

Appendix B5.–Division of Commercial Fisheries Age-Length Form.

Upper Cook Inlet Adult Salmon Age-Length Form

LOCATION: Fish Creek weir CARD #:

DATE: SAMPLERS:

START TIME: END TIME:

No.	Sex	Length	Genetics #	Age Scale
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
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37				
38				
39				
40				

COMMENTS:

_____

_____

_____

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_____

_____

Fishwheel Information Totals

Reds Sampled: _____

Reds Not Sampled: _____

REDS GRAND TOTAL _____

Incidental Catch:

Kings:
Pinks:
Dollies:
Chums:
Silvers:
Other:

Time fishwheel started:_____

Time fishwheel stopped:_____

Sex: 1-male 2-female
Length: mid eye to fork-of-tail in nearest mm.
Genetic # - vial number if sample is taken.

filename: 13alffc.xls

APPENDIX C: INSTRUCTIONS FOR COLLECTION TISSUE FOR DNA ANALYSIS

Appendix C1.–Division of Commercial Fisheries Instructions for collecting tissue for DNA analysis.

Non-lethal Sampling Finfish Tissue for DNA Analysis, ADF&G Gene Conservation Lab, Anchorage

I. General Information

We use axillary tissue samples from individual fish to determine the genetic characteristics and profile of a particular run or stock of fish. The most important thing to remember in collecting samples is that **only quality tissue samples give quality results**. If sampling from carcasses: tissues need to be as "fresh" and as cold as possible and recently moribund, do not sample from fungal fins.

Sample preservative: Ethanol (EtOH) preserves tissues for later DNA extraction without having to store frozen tissues. Avoid extended contact with skin.

II. Sample procedure:

1) Tissue type: Axillary process; clip one axillary process from each fish (see attached print out).
2) Prior to sampling, fill the tubes half way with EtOH. Fill only the tubes that you will use for a particular sampling period. The squirt bottle is for day use only since it will leak if unattended.
3) To avoid any excess water or fish slime in the vial, wipe the axillary process dry prior to sampling. Using the dog toe nail clipper or scissors, clip off axillary process (**1/2 -1" max**) to fit into the cryovial (Appendix C2).
4) Place axillary process into EtOH. The ethanol/tissue ratio should be **slightly less than 3:1** to thoroughly soak the tissue in the buffer.
5) Top up tubes with EtOH and screw cap on securely. Invert tube twice to mix EtOH and tissue. Periodically, wipe or rinse the clippers so not to cross contaminate samples.
6) Data to record: Record each vial number to **paired data** information, electronic copy preferred.
7) Discard remaining ethanol from the 500 ml bottles before shipping. **Tissue samples must remain in 2ml ethanol**, these small quantities require HAZMAT paperwork. Please follow packing instructions for HAZMAT items. Store vials containing tissues at room temperature, but away from heat. In the field: keep samples out of direct sun, rain, and store capped vials in a dry, cool location. Freezing not required.

III. Supplies included with sampling kit:

1) Clippers–used for cutting the axillary process.
2) Cryovial–2.0 ml prelabeled plastic vial or tube.
3) Caps–cap for each vial.
4) Sampling rack–plastic box for holding cryovials during sampling.
5) Ethanol (EtOH)–in Nalgene bottle(s).
6) Squirt bottle–to fill and/or "top off" each cryovial with EtOH
7) Sampling instructions
8) Laminated "return address" labels

Appendix C2.–Location of the axillary process.